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DEVELOPMENT OF *CHEMORROSION* INTERACTIVE MULTIMEDIA IN CORROSION TOPIC THIRD GRADE OF SENIOR HIGH SCHOOL

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Abstrak

Tujuan penelitian ini adalah untuk mengetahui kelayakan multimedia interaktif, dan pergeseran konsepsi siswa pada materi korosi kelas XII SMA. Metode penelitian yang digunakan adalah metode *Research & Development* (*R & D*). Instrumen penelitian yang digunakan adalah lembar validasi media, lembar angket respon siswa, dan lembar tes hasil belajar siswa dengan menggunakan *Certainty of Response Index* (CRI). Sumber data diperoleh dari dosen kimia dan guru kimia, serta 15 siswa SMA Kelas XII. Berdasarkan hasil penelitian, rata-rata persentase penilaian dosen kimia dan guru kimia terhadap kelayakan multimedia interaktif *Chemorrosion* adalah 88,27% dengan kategori sangat layak, sedangkan respon siswa terhadap kelayakan multimedia interaktif *Chemorrosion* adalah 97,51% dengan kategori sangat layak. Selain itu, hasil penelitian menunjukkan adanya pengaruh multimedia interaktif *Chemorrosion* terhadap perubahan konsepsi siswa, yaitu peningkatan persentase siswa yang tahu konsep sebesar 66,11%, penurunan persentase siswa yang tidak tahu konsep sebesar 50,28%, dan penurunan persentase siswa yang mengalami miskonsepsi sebesar 15,84%.
Kata kunci: Multimedia Interaktif, Korosi

Abstract

The purpose of this research to determine the feasibility of interactive multimedia, and shifting conceptions of students in corrosion topic third grade senior high school. The method which was used is Research & Development (R & D). Instruments which was used in this research is media validation sheet, student responses questionnaire sheet, and student test sheet using Certainty of Response Index (CRI). Sources of data was obtained from the lecturer and teacher of chemistry, 15 students oh third grade. Based on the research, the average percentage of lecturer and teacher chemistry assessment of the feasibility of interactive multimedia Chemorrosion was 88.27% very feasible category, while the students' response to the feasibility of interactive multimedia Chemorrosion was 97.51% very feasible category. Moreover, the results showed the influence of interactive multimedia Chemorrosion on students' conceptions shifting, namely increase in the percentage of students who know the concept of 66.11%, a decrease in the percentage of students who did not know the concept of 50.28%, and the decreae in percentage of students who have misconceptions of 15.84%.
***Keywords**: Interactive Multimedia, Corrosion*

INTRODUCTION

The curriculum is one of component that could make a significant contribution to realize the development potential of learners. Based on Education and Culture Ministry No. 69 of 2013 concerning the curriculum of high school/MA, one of the main competencies (KI) in chemistry learning high school/MA is competence 3, namely understanding, applying, analyzing factual knowledge, conceptual, procedural, based on curiosity about science, technology, art, culture, and humanities with human insight, national, state and civilization-related causes of phenomena and events, as well as apply the procedural knowledge in a specific field of study according to their talents and interests to solve the problem.

Based on Education and Culture Ministry No. 69 of the high school curriculum, Curriculum 2013 requires learning patterns that initially learning pattern is converted into a single tool based learning multimedia tools. This is important for teachers to equip devices with multimedia learning appropriate and acceptable to all students[1].

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Chemistry was included in clumps science. Thus chemical characteristics similar to most of the science. In chemistry to understand the concept that there is a relationship between abilities to explain of chemical phenomena by using a macroscopic, the molecules (submicro), and symbolic) level of representation[2].

Chemistry topics are generally related to or based on the structure of matter (microscopic), chemistry proves a difficult subject for many students. The abstract concepts (microscopic) are important because further chemistry/science concepts or theories cannot be easily understood if these underpinning concepts are not sufficiently grasped by the student[3]. Because of the more difficult level, the most students have difficulty learning in the basic concepts of chemistry which are microscopic, and not a few who have misconceptions.

One of the topic that contained microscopic level was corrosion topic. The process of corrosion certainly can not be observed directly because it involves molecules. This is supported by the results of research that some participants justify the brownish colour on iron nails when immersed in a blue copper sulphate solution by stating that they rust[4].

One way that can be used to avoid misconceptions by using the media while learning . Media that used in learning be able to grouping into four big groups, they are visual, audio, audio visual, and multimedia[5]. Interactive multimedia is one of the utilization of computer-based multimedia learning. In learning environment that used multimedia, students can establish the relationship between the three levels of representation, such as macroscopic, microscopic, and symbolic in the chemistry topics and make learning more meaningful and effective[2].

Moreover, by using interactive media inexperienced learners were better able to transfer what they have learned about the scientific system when visual and verbal explanations are presented simultaneously rather than when visual and verbal explanation separated[6]. Explanation of the visual aspects of the interactive multimedia one of them realized with the animation. By using visualization animation, can explain the concepts which are microscopic that can't be observed directly.

Because of that, the development of interactive multimedia is very important to help students understand the material corrosion which are microscopic, so students didn't imagine about the concept of corrosion, especially in the process of corrosion that wasn't consistent with the concept that has been agreed upon by the experts.

Based on the exposure, the researchers conducted a study on "Development of Chemorrosion Interactive Multimedia Corrosion Topic Third Gradeof Senior High School".

METHOD

The type of research was Research and Development. The stages had been done conducted by Sugiyono product development methodology is limited only to a limited product test[7]. Stages conducted by researchers: 1) preliminary study, 2) the design of the product, 3) review of the product, 4) the revision of the product, 5) product validation, and 6) limited product test.

Data collection methods that was used in this research is the observation method, test methods, and questionnaire methods.

Data analysis techniques that was used in this research is descriptive qualitative analysis. Sources of data on research was obtained from teachers, lecturer, and 15 high school students who have received the corrosion topic.

The instruments that was used in this research are media validation sheet, student response sheet, student test sheet.

Validation result by chemistry lecturer and teacher for interactive multimedia will be presented based on the Likert scale[8]. The formula was used in the calculation of the validation results for feasibility are

$$P\ (\%) = \frac{scores\ obtained}{the\ maximum\ score}\ x\ 100\%$$

The results of the validation analysis was used to determining the feasibility of interactive multimedia Chemorrosion developed using score interpretation [8]. Based on the criteria, interactive multimedia Chemorrosion said to be feasible if the percentage is ≥ 61%[8].

While the percentage of student response data is calculated based on the Guttman scale[8]. The data obtained are then processed in the form of a percentage according to the formula:

$$P\ (\%) = \frac{scores\ obtained}{the\ maximum\ score} x\ 100\%$$

Percentage Obtained interpreted into Likert scale. Interactive Multimedia Chemorrosion feasible if the percentage Obtained by ≥ 61%.

Analysis of students' conceptions conducted quantitative description using students' conceptions of data before and after the use of interactive multimedia Chemorrosion. Identification of students' conceptions using Certainty of Response Index (CRI).

RESULT AND ANALYSIS

Validation by lecturers and teacher.

Based on the results of the validation conducted by lecturer of chemistry and teacher, interactive multimedia Chemorrosion developed has average percentage of the overall aspects of 88.27% (very feasible) with the details in Table 1 below:

Table 1. Results of Validation Multimedia

Assessment Aspect	Percentage Rate (%)	Criteria
Quality of the content and objectives	89,67	Very Feasible
Instructional Quality	85,56	Very Feasible
Technical Quality	89,52	Very Feasible
Language	88,33	Very Feasible
The average	88,27	Very Feasible

The quality of the content and Objectives

Viewed from the content and purpose of the feasibility of multimedia interactive learning in corrosion topic that was developed is fullfil the feasibility with a percentage of 89.67% with a very feasible category. This showed the media was developed appropriate with the learning objectives.

In its arrangement, the matter presented in proportion, consistent, and systematic. Animations and images are presented to clarify the concept, the design of multimedia learning according to the ability of high school students, and in this multimedia can activate the auditory (audio), vision (visual), and thinking ability of students to solve problems (intellectual). A study will have a large impact on students' understanding if the use of intellectual activity and learning to use all the senses[9].

Quality of instructional

Based on the feasibility of instructional multimedia interactive learning that was developed in corrosion topic is said fullfil the feasibility with a percentage of 85.56% with a very feasible category. This showed that the multimedia was developed given concept can lead students to reflect, such as answering the questions and prepare a summary.

The use of user control (next, pause, previous, etc) right, so as to give students the opportunity to learn[10]. Media format allows students to learn independently. Exercises can help students to understand the concepts and help check topic understanding.

Technical Quality

In terms of technical quality, multimedia interactive learning that was developed in corrosion topic is said fullfil the feasibility with a percentage of 89.52% with a very feasible category. This showed that the multimedia was developed model selection, size and color of the text have been appropriate. Text color, text layout, background animations/images, buttons that was used work properly.

Language

Viewed from its language of multimedia interactive learning in corrosion topic that was developed is said fullfil feasibility with a percentage of 88.33% with a very feasible category. This showed that the multimedia was developed, language and grammar are correct. The language used in appropriate with the age of the students, and each of paragraph there was relation.

Student Response

Based on the results of student responses, Chemorrosion interactive multimedia that was developed is very feasible category with an average percentage of all aspects of 94.69% (very feasible) with the details in Table 2 below:

Table 2. Results of Student Response

Assessment Aspect	Percentage Rate (%)	Criteria
Students' understanding of the material	96,11	Very Feasible
The attractiveness of the media	90,83	Very Feasible
The clarity of display	97,78	Very Feasible
Language	93,33	Very Feasible
The average	94,69	Very Feasible

Students Understanding of the Matter

Viewed of the criteria of students' understanding of the material based on student responses, Chemorrosion interactive multimedia in corrosion topic that was developed is fullfil the feasibility with a percentage of 96.11% with a very feasible category. This showed that the developed interactive multimedia can help students to learn the material corrosion videos, animations, images, and sample questions are provided.

These results are consistent with a statement stating that the multimedia learning can help students' understanding in learning the concept that describes a process that can not be seen directly by eye (invisible)[5]. This was confirmed by a decrease in students that don't know concept of 50, 28%, the increase in students who know the concept of 66.11%, and a decrease in student misconceptions of 15.84% in corrosion topic.

The attractiveness of the Media

Viewed of the attractiveness of multimedia on student responses, Chemorrosion interactive multimedia in corrosion topic that was developed is fullfil the feasibility with the percentage of 90.83% with a very feasible category. This showed that the multimedia was developed facilitate students in independent study. This is supported by the statement that learning with multimedia will make students more spirit to find information, and more motivated in learning process[11].

The clarity of display

Viewed from the responses of students, Chemorrosion interactive multimedia in corrosion topic that was developed is fullfil the feasibility with the percentage of 97.78% with a very feasible category. This showed that the letters and sentences in interactive multimedia Chemorrosion clear and easy to understand, Chemorrosion interactive multimedia buttons in function properly, images/animations are presented attractively. This is supported by the reserach that the attractive appearance and aesthetics and ease of navigation is a good learning multimedia requirements[11].

Language

Viewed from the response of the students, language that was used in Chemorrosion interactive multimedia in corrosion topic that was developed is fullfil the feasibility with a percentage of 93.33% with a very feasible category. This suggests that the language used in the interactive multimedia Chemorrosion easily understood, the terms contained in this interactive multimedia Chemorrosion easy to understand, and the language used

is coherent, linked between chapters, paragraphs and sentences.

CLOSING

Conclusion

Based on the research results which obtained and had been analyzed, it was concluded as follows:

1. Based on the validation of chemical lecturer and high school chemistry teacher on the feasibility of interactive multimedia Chemorrosion, obtained validation percentage of average is 88.27% with a very feasible category. The validation is based on several criteria that include: the quality of the content and objectives, instructional quality, technical and language quality. Moreover, the results obtained from the students' response to interactive multimedia Chemorrosion also showed very feasible category with an average percentage of 94.69%. The student's response is based on students' understanding of the material aspects, the attractiveness of the media, the clarity of the display media, and language. These results indicate that the interactive multimedia Chemorrosion been feasible in corrosion topic learning third grade of senior high school.
2. Interactive Multimedia Chemorrosion also a give positive impact on student conception in corrosion topic. This can be proved by an increasing the amount of students that know the concept of 66.11%, in other hand the number of students that don't know concept and misconceptions decreasing of 50.28% and 15.84%. These results indicate that the students helped with the interactive multimedia Chemorrosion in studying corrosion topic.

Suggestion

Based on the results of data analysis and conclusions in the above, it can be argued suggestion, namely interactive multimedia will be very important and useful to be developed, especially in the learning material requires visualization as volta cell, electrolysis cell, molecular shape, etc., making it easier for students to understand the material the. In addition, further research is needed to implement interactive multimedia Chemorrosion in teaching and learning activities in the classroom.

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